DOCUMENT RESUME

ED 075 789 CS 000 478

AUTHOR	Seels, Barbara, Comp.; Dale, Edgar, Comp.
TITLE	Readability and Reading. An Annotated Bibliography. 1971 Revision.
INSTITUTION	International Reading Association, Newark, Del.
PUB DATE	71
NOTE	20p.
AVAILABLE FROM	International Reading Association, 6 Tyre Ave., Newark, Del. 19711 ($0.75 non-member, $0.50 member)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Annotated Bibliographies; Content Reading; Learning Disabilities; Literacy; Literary Styles; Mass Media; Measurement; *Readability; Reading Materials; *Reading Research; Sentence Structure; Vocabulary

ABSTRACT

An updated version of a bibliography of the same title published by the International Reading Association in 1966 is presented. The 1966 bibliography emphasized references from 1962 to 1965 and also included some early classic references. In the 1971 revision, emphasis is placed upon sources from the 1965 to 1970 period. The revised bibliography is selective, not comprehensive. Content of the bibliography is divided into the following sections: (1) General References on Readability, (2) Measuring of Readability, (3) Readability and Sentence Structure, (4) Readability and Vocabulary, (5) Readability and Literary Style, (6) Readability in Subject Area Materials, (7) Readability and Types of Learners, (8) Readability and Media, (9) Readability and Literacy Materials, and (10) Readability and Legibility. The bibliography contains 125 references which are alphabetized by author within each section. Complete citations and informative annotations are included. (This document previously announced as ED 049 896.) (Author/DH)

ED 075789

READABILITY AND READING

An Annotated Bibliography

Compiled by Barbara Seels
University of Pittsburgh
and
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1971 Revision

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Ramon Ross, *General Editor*

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Published by
INTERNATIONAL READING ASSOCIATION
Six Tyre Avenue • Newark, Delaware 19711

CS 000 478

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INTRODUCTION

Readability and Reading is a revision of a bibliography of the same title published by the International Reading Association in 1966. The 1966 bibliography emphasized references from the 1962-1965 period and also included some early classic references.

In this 1971 revision of the bibliography, emphasis is placed upon sources from the 1965-1970 period. Readers may refer to the 1966 bibliography for earlier sources. A few sources from the 1966 bibliography are included but not annotated here. The revised bibliography is selective, not comprehensive.

Content of the bibliography is divided into ten sections: General References on Readability, Measuring of Readability, Readability and Sentence Structure, Readability and Vocabulary, Readability and Literary Style, Readability in Subject Area Materials, Readability and Types of Learners, Readability and Media, Readability and Literacy Materials, and Readability and Legibility.

Karen Filoso, graduate student at The Ohio State University, assisted in the preparation of this material.

GENERAL REFERENCES ON READABILITY

BEARD, J. G. "Comprehensibility of High School Textbooks: Association with Content Area," *Journal of Reading*, 11 (December 1967), 229-234.

Reports a study of differences in comprehensibility of subject matter textbooks. Prose used in current high school textbooks on American government, world history, biology, and chemistry was comprehended about the same.

BORMUTH, JOHN R. "New Data on Readability," in J. Allen Figurel (Ed.), *Forging Ahead in Reading*, 1967 Proceedings, Volume 12, Part 1. Newark, Delaware: International Reading Association, 1968, 488-492.

Presents an interpretation of recent developments in readability research.

CHALL, JEANNE S. *Readability: An Appraisal of Research and Application.* Columbus, Ohio: The Ohio State University, 1958, O.P.

DALE, EDGAR, and JEANNE CHALL. "The Concept of Readability," *Elementary English*, 26 (January 1949), 19-26.

DALE, EDGAR, and TAHER RAZIK. *Bibliography of Vocabulary Studies, 1963.* Columbus, Ohio: The Ohio State University, 1963, 119-122.

GRAY, WILLIAM S., and BERNICE E. LEARY. *What Makes a Book Readable?* Chicago: University of Chicago Press, 1935.

HILL, W. "Content Textbook: Help or Hindrance," *Journal of Reading*, 10 (March 1967), 408-413.

Argues that there is solid evidence to confirm that the content area textbook, as traditionally used, is less help, and possibly more hindrance, to the student than commonly assumed. Efforts to improve the readability of content textbooks are promising.

KINGSTON, A. J., and W. W. WEAVER. "Recent Developments in Readability," *Journal of Reading*, 11 (October 1967), 44-47.

States that the major weakness of readability formulas is that they are based on correlational techniques only. While cross-validation studies in this area are extremely costly, the possible advances using prediction measures seem to have been reached.

KLARE, GEORGE R. *The Measurement of Readability.* Ames, Iowa: Iowa University Press, 1963.

WALE, SINCLAIR J. "Readability – A Neglected Criterion in Secondary Textbook Selection," *Journal of the Reading Specialist*, 9 (October 1969), 12-16, 22.

Reviews the research on readability, suggests these findings as one basis for curriculum change, and summarizes some of the factors from this research that can make a test more readable.

WEINTRAUB, SAMUEL. "Research: Textbooks," *Reading Teacher*, 21 (December 1967), 283.

Annotates references ranging from 1935-1964. States in conclusion that in no other area of research in reading are the findings so consistent as in the area reported here. The research findings add up to the need for the teacher to instruct his pupils in the reading of classroom texts.

MEASURING OF READABILITY

Factors

BORMUTH, JOHN R. "Comparable Cloze and Multiple-Choice Comprehension Test Scores," *Journal of Reading*, 10 (1967), 291-299.

Reports that the comparable scores obtained in this study provided a set of criterion reference points to be used in judging the adequacy of a person's performance on a cloze test. Criterion reference scores are essential in readability research for scaling the comprehension difficulties of passages.

JACOBSON, M. P., and M. A. MAC DOUGALL. "Computer Management of Information and Structure in Computer-Supported Instructional Materials," *Educational Technology*, 10 (March 1970), 39-42.

Presents flow chart for managing the design of programed instruction units taking the readability variables into consideration. Offers a method for using the computer to analyze readability. Reports the use of readability and analysis as an evaluative model of programing technique. Explores the relationship between reading difficulty and success with self-instructional materials.

ROSENSHINE, BARAK. "New Correlates of Readability and Listenability," in J. Allen Figurel (Ed.), *Reading and Realism*, 1968 Proceedings, Volume 13, Part 1. Newark, Delaware: International Reading Association, 1969.

Discusses horizontal readability. Research findings indicated five variables of reading difficulty: Vagueness, Explaining Links, Frequency of Examples, Rule and Example Pattern (more effective than inductive or deductive), and Irrelevancy.

Formulas and Techniques

BARKER, D. G., and W. W. STOKES. "Simplification of the Revised Lorge Readability Formula," *Journal of Educational Research*, 61 (May 1968), 398-400.

Relates that various measures of vocabulary load for 165, 100-word passages from ten books were compared and correlated to determine the extent to which a proposed measure (word length) could be used to

estimate an established but more tedious measure (number of words not on the Dale list). Number of words of six or more letters was found to correlate with number of words not on the Dale list to the extent of 0.78 and with a number of affixed morphemes to the extent of 0.80.

BORMUTH, JOHN R. *Development of Readability Analyses.* Washington, D.C.: Project No. 7-0052, U.S. Office of Education, 1969.

The basic objective was to obtain evidence upon which to base a theory of the processes involved in language comprehension. The correlations between a large number of linguistic features and a measure of the difficulty students exhibited in comprehending the written language samples in which those features occurred were determined. The applied objective was to develop regression formulas for estimating if instructional materials are suitable for students of varying levels of language comprehension ability.

BORMUTH, JOHN R. "Mean Word Depth as a Predictor of Comprehension Difficulty," *California Journal of Educational Research,* 15 (November 1964), 226-231.

BORMUTH, JOHN R. "Readability: A New Approach," *Reading Research Quarterly,* 1 (Spring 1969).

Suggests method for ranking reading materials by using the Cloze test scores of readers of different ages and grade levels.

CHALL, JEANNE, and EDGAR DALE. "A Formula for Predicting Readability," *Educational Research Bulletin,* 27 (January 21, 1948), 11-20.

COLEMAN, E. B. "Developing a Technology of Written Instruction, Some Determiners of the Complexity of Prose," in Ernst Z. Rothkopf (Ed.), *Symposium on Verbal Learning Research and the Technology of Written Instruction.* New York: Rand McNally, 1968.

Reports a set of five experiments in which the test of understanding was to have the reader perform the task assigned by the passage.

DALE, E., and R. W. TYLER. "A Study of the Factors Influencing the Difficulty of Reading Materials for Adults of Limited Reading Ability," *Library Quarterly,* 4 (July 1934), 384-412.

EKWALL, E. E., and I. B. HENRY. "How to Find Books Children Can Read," *Reading Teacher,* 22 (December 1968), 230-232.

Defines standards for an informal reading test which teachers can use to assign grade level ratings to books for independent reading. Suggests method for marking the assigned level on books in the classroom or school library. This method of estimating readability level takes little time or training. Books are tried out on children in order to arrive at the estimate.

ELLEY, WARWICK B. "The Assessment of Readability by Noun Frequency Counts," *Reading Research Quarterly,* 4 (Spring 1969), 411-427.

Describes and illustrates a new method of assessing the readability of children's reading material using a word frequency count to rate the nouns in a given passage. The average frequency level of the nouns was used to provide a highly valid estimate of reading difficulty.

FANG, IRVING R. "The 'Easy' Listening Formula," *Journal of Broadcasting,* 11 (Winter 1966-1967), 63-68.

Contends that most readability formulas are as long-winded and difficult to understand as the worst sentence they measure. Suggests ways of simplifying the Flesch Reading Ease Formula. Presents a new formula which correlates with Flesch R. E. and is easier to apply.

FLESCH, RUDOLF. *How to Test Readability*. New York: Harper and Brothers, 1951.

Provides a handy manual for those who want to use the Flesch readability formula which is based on scores of reading ease and human interest. Answers the most often asked questions about readability.

FRY, EDWARD. "A Readability Formula that Saves Time: Readability Graph," *Journal of Reading*, 11 (April 1968), 513-516.

Presents a revision of the readability graph for pinpointing readability levels together with directions for its use. Presents validity data which compares readability scores on several different formulas. Fry plots the number of sentences per 100 words and number of syllables per 100 words, with 100 word selections excluding proper nouns. The validity of the graph is based on the fact that grade level ratings were arrived at through "plotting lots of books" which publishers had designated to be at certain grade levels.

FRY, EDWARD. "A Readability Graph for Librarians, Part I," *School Libraries*, 19 (Fall 1969), 13-16.

Explains a recently developed readability formula which requires little time and few mathematical computations.

GAVER, MARY. "A Readability Graph for Librarians, Part II," *School Libraries*, 19 (Fall 1969), 23-25.

Demonstrates the simplicity in using the Readability Graph and illustrates the author's comments with specific examples.

GOLTZ, CHARLES R. "A Table for the Quick Computation of Readability Scores Using the Dale-Chall Formula," *Journal of Developmental Reading*, 7 (Spring 1964), 175-187.

GOUGH, P. B. "Grammatical Transformations and Speed of Understanding," *Journal of Verbal Learning and Verbal Behavior*, 4 (1965), 107-111.

Defines understanding as verification. The reader was shown a picture of an event and a sentence. The reader's task was to say whether the sentence truly described the event.

GUNNING, ROBERT. *The Technique of Clear Writing* (rev. ed.). New York: McGraw-Hill, 1968.

Discusses ten principles of clear writing. Gives Gunning's Fog Index with special applications.

KLARE, GEORGE R. "A Table for Rapid Determination of the Dale-Chall Readability Scores," *Educational Research Bulletin*, 36 (February 13, 1952), 43-47.

Included when "A Formula for Predicting Readability" by Chall and Dale is ordered from Publications Sales, 124 West 17 Avenue, The Ohio State University, Columbus, Ohio 43210. Cost for both $1.

KLARE, GEORGE R. et al. "Automation of the Flesch Reading Ease Readability Formula with Various Options," *Reading Research Quarterly*, 4 (Summer 1969), 550-559.

Describes a computer program of increased accuracy and flexibility for the application of the Flesch Reading Ease and related readability formulas.

LORGE, IRVING. *The Lorge Formula for Estimating Difficulty of Reading Materials.* New York: Bureau of Publications, Teachers College, Columbia University, 1959.

MC LAUGHLIN, G. H. "SMOG Grading: A New Readability Formula," *Journal of Reading*, 12 (May 1969), 639-646.

Presents and validates SMOG grading method of establishing readability. This new method counts polysyllabic words in a fixed number of sentences to give an accurate index of the relative difficulty of various text. A formula is given for converting polysyllable counts into grades.

MC LEOD, JOHN. "The Estimation of Readability of Books of Low Difficulty," *British Journal of Educational Psychology*, June 1962, 112-118.

MILLER, G. R., and E. B. COLEMAN. "A Measure of Information Gained During Prose Learning," *Reading Research Quarterly*, 3 (Spring 1968), 369-386.

Suggests the use of an IG (information gain) score to give a measure of what the subject knows about the passage before he begins reading it. Subjects are required to guess successively every word in a passage. The IG score is correlated with a number of other descriptors.

POWERS, R. D., W. A. SUMMER, and B. E. KEARL. "A Recalculation of Four Adult Readability Formulas," *Journal of Educational Psychology*, 49 (April 1958), 99-105.

SPACHE, GEORGE. "A New Readability Formula for Primary Grade Reading Materials," *Elementary School Journal*, 53 (March 1953), 410-413.

Presents a formula for estimating the reading difficulty and grade level of primary grade reading materials. The formula uses indexes of average sentence length and percentage of hard words.

SPAULDING, SETH. "A Spanish Readability Formula," *Modern Language Journal*, 40 (December 1956), 433-441.

TAYLOR, W. L. "Cloze Procedures: A New Tool for Measuring Readability," *Journalism Quarterly*, 30 (Fall 1953), 415-433.

Presents new technique for estimating readability by deleting words from a passage which a subject then attempts to complete.

Reliability and Validity

AQUINO, MILAGROS R. "The Validity of the Miller-Coleman Readability Scale," *Reading Research Quarterly*, 4 (Spring 1969), 342-357.

Validates the Miller-Coleman Readability Scale by using word-for-word recall and subjective judgment. The scale uses indices of reading difficulty and information gain.

BORMUTH, JOHN R. "The Implications and Use of Cloze Procedure in the Evaluation of Instructional Programs." Los Angeles: University of California, 1967.

The cloze readability procedure was examined to determine its utility as a device for evaluating effectiveness of instructional programs. The possibility of developing a method which incorporates the cloze procedure for making criterion reference tests over verbally presented instruction was also investigated.

FRY, E. B. "Readability Graph Validated at Primary Levels," *Reading Teacher,* 22 (March and May 1969), 534-538, 750.

Reports some comparisons of a Readability Graph grade level scores with scores and ranking obtained on the Spache Readability Formula, an oral cloze technique, and errors made by children while reading the passages orally. Both the Spache Formula and the Readability Graph had very high correlations with the cloze method and satisfactory correlations with the oral reading method and each other. The Readability Graph is presented in an addendum in the May 1969 issue of *The Reading Teacher.*

MAGINNIS, G. H. "The Readability Graph and Informal Reading Inventories," *Reading Teacher,* 22 (March 1969), 516-518.

Warns against selecting passages from graded books for informal reading inventories because the brief passages selected may not be typical of materials at the designated level of the book.

PAUK, W. "A Practical Note on Readability Formulas" (with reply by G. H. McLaughlin), *Journal of Reading,* 13 (December 1969), 207-211.

Compares the readability formulas devised by Fry and McLaughlin to the Dale-Chall formula and reports similar results with the Fry and Dale-Chall formulas, but variant results using the McLaughlin formula.

RANKIN, EARL F., and W. CULHANE. "Comparable Cloze and Multiple-Choice Comprehension Test Scores," *Journal of Reading,* 13 (December 1969), 193-198.

Replicates two studies by Bormuth comparing multiple-choice and cloze tests as measures of comprehension and concludes, like Bormuth, that the more easily constructed cloze test can be used to measure comprehension or select reading materials.

WEINTRAUB, SAMUEL W. "Cloze Procedure," *Reading Teacher,* 21 (March 1968), 567+.

Reviews research on cloze procedure. Examines usefulness of procedure in practice. Concludes the cloze procedure has promise as a valid, reliable, and simple measure of readability and comprehension.

READABILITY AND SENTENCE STRUCTURE

COLVIN, CYNTHIA M. "Psychological Principles in Materials Selection," in J. Allen Figurel (Ed.), *Reading and Realism*, 1968 Proceedings, Volume 13, Part 1. Newark, Delaware: International Reading Association, 1969.

Notes that meaningful material and natural (normal conversational length) sentences are more easily comprehended and retained by the child. Short, artificial sentences may be remote from familiar language experience.

DAVIS, O. L., JR., and J. G. SEIFER. "Some Linguistic Features of Five Literature Books for Children," *Elementary English*, 44 (December 1967), 878-882.

Reports that the five books studied contained structural elements and some important elements within structure which were, in the main, consistent with the language development of the children for whom the books were written. Suggests that linguistic criteria can be used in addition to readability formulas.

MC LAUGHLIN, G. HARRY. "What Makes Prose Understandable?" doctoral dissertation, University College, London, 1966.

States that the linguistic measures which have been found to have the greatest predictive power are word and sentence length. Shows that these measures are, respectively, indicators of semantic and syntactic sources of reading difficulty.

MOIR, H. "Linguistic Factors Related to Style and Meaning in Written Language," *Elementary English*, 47 (February 1970), 215-222.

Examines the relationship between the oral language patterns that the child brings to the reading experience and the language found in the reading material. Relates readability, reading, and linguistic concepts.

STRICKLAND, RUTH G. "The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children," *Bulletin of the School of Education at Indiana University*, 38 (July 1962).

Studies the oral language patterns of children and the frequency of their use in the reading textbooks of the children.

TATHAM, SUSAN M. "Using Multiple Choice Questions to Measure the Effect on Comprehension of Material Written with Select Language Patterns," University of Wisconsin, February 1968.

Examines the effect of frequently used oral language patterns in written material on the reading comprehension of fourth graders. Factors controlled were length, readability, content, and style.

TATHAM, S. M. "Reading Comprehension of Materials Written with Select Oral Language Patterns: A Study at Grades 2 and 4," Technical Report No. 86. Madison: Wisconsin Research and Development Center for Cognitive Learning, University of Wisconsin, 1969.

Devises two reading comprehension tests to determine whether second or fourth graders better comprehend material written with oral language

patterns that appear frequently in their speech, than material written with patterns that appear infrequently.

YNGVE, VICTOR H. "A Model and an Hypothesis for Language Structure," *Proceedings of the American Philosophical Society*, 104 (October 1960).

YNGVE, VICTOR H. "Computer Programs for Translation," *Scientific American*, 206 (June 1962), 68-76.

READABILITY AND VOCABULARY

DALE, EDGAR. "Vocabulary Measurement: Techniques and Major Findings," *Elementary English*, 42 (December 1965), 895-901.

Analyzes value of word list studies and predicts the areas of emphasis for the vocabulary research of the future.

DALE, EDGAR. *The Words We Know: A National Inventory*. The Ohio State University, forthcoming (late 1971).

Includes familiarity scores in grades four, six, eight, ten, twelve, thirteen, and sixteen on about 45,000 words.

DUNN, MARY KATHRYN, and JAMES L. LAFFEY (Compilers). "Research on Reading: Word Lists," *ERIC/CRIER Reading Review Series*, 2, Bibliography 18 (September 1969).

Indicates vocabulary loads in various reading materials; phonic generalizations applied to word lists; and basic speaking, writing, or reading vocabularies of various groups.

EMANS, ROBERT. "Word Lists from Common Signs," *Journal of Reading*, 9 (October 1969), 32-37.

Presents words which appear in common signs in various geographical locations. Organized into "Words of Travel," "Words of Work," and "Words of General Significance."

GATES, ARTHUR I. "Vocabulary Control in Basal Reading Material," *Reading Teacher*, 15 (November 1961), 81-85.

Reports a study which suggests that the fact that a word is "new" in the basal reading materials is an unreliable indication of its difficulty at fourth grade level.

LORGE, IRVING, and EDWARD L. THORNDIKE. *A Semantic Count of English Words*. New York: Teachers College, Columbia University, 1938.

Lists words with their Thorndike 20,000 word list classification according to frequency of occurrence.

SISTER MARY AGNES. "How Readable are Primary Religion Textbooks?" *Catholic School Journal,* 66 (February 1966), 60-61.

Gives list of unfamiliar words which appear in twenty or more primary religion books. The writer evaluated 48 books using the Spache formula. Difficiencies in vocabulary, typography, and picture labeling were found.

THORNDIKE, F. L., and IRVING LORGE. *The Teacher's Word Book of 30,000 Words.* New York: Teachers College, Columbia University, Bureau of Publications, 1944.

Lists words which occur most frequently in English writing. Rates words according to frequency and range of occurrence. Based on content analysis.

READABILITY AND LITERARY STYLE

CARVER, RONALD P. "The Efficacy of 'Chunking' Reading Materials: Final Report." Silver Springs, Maryland: American Institutes for Research, 1968.

No statistically significant difference existed between the experimental chunked format and the control format either on the reading role or on comprehension measures. However, another control format (no punctuation or capitalization) did result in significant decrements in reading rate and comprehension. It was concluded that the spatial separation of reading material into meaningfully selected groups does not improve the reading efficiency of mature readers.

COLEMAN, E. G. "Experimental Studies of Learnability: Their Contributions to a Technology of Written Instruction," in John R. Bormuth (Ed.), *Research Designs in Reading.* Newark, Delaware: International Reading Association, 1967.

Describes techniques now available for constructing books that optimally facilitate a combination of all subskills.

READABILITY IN SUBJECT AREA MATERIALS

Mathematics

SMITH, F. "Readability of Junior High School Mathematics Textbooks," *Mathematics Teacher,* 62 (April 1969), 289-291.

Reports that pressure to publish "modern" textbooks has increased the readability level of material.

SMITH, K. J. "Application of Readability Formulae to Mathematics Test Materials," *Arithmetic Teacher*, 12 (May 1965), 354-355.

WIEGAND, R. B. "Pittsburgh Looks at the Readability of Mathematics Textbooks," *Journal of Reading*, 11 (December 1967), 201-204.

Concludes that the predicted readability levels of our mathematics textbooks run consistently higher than the performance levels of most students. Books for advanced mathematics courses impose a particularly heavy reading burden on students.

Psychology

LEE, W. D., and B. R. BELDEN. "Cross-Validation Readability Study of General Psychology Textbook Material and the Dale-Chall Readability Formula," *Journal of Educational Research*, 59 (April 1966), 369-373.

Gives objective evidence that within certain limits, the Dale-Chall Readability Formula may be used to determine the comprehension difficulty of general psychology textbook material.

Reading

COOPER, B. "Appeal of the Little House Books," *Elementary English*, 42 (October 1965), 636-638.

Relates that "The Little House" books by Laura Ingalls Wilder were found to have fifth and sixth grade readability levels and measure high on Flesch's scale of human interest. These books have high appeal for children in grades four through eight. Concerned with social relationships, they contain authentic settings and characters with which the children can identify.

NEALON, T. T. "Adapted Classics in the Junior High School," *Journal of Reading*, 9 (March 1966), 256-262.

Includes list of adapted classics for junior high school students with third to sixth grade reading levels. Compares excerpts from originals and adaptations.

SHNAYER, SIDNEY W. "Relationships between Reading Interest and Reading Comprehension," in J. Allen Figurel (Ed.), *Reading and Realism*, 1968 Proceedings. Newark, Delaware: International Reading Association, 1969.

Reports the performance of sixth grade readers who were studied experimentally. High interest produced greater comprehension which enabled a child to read beyond his measured reading ability. High ability students were less affected by reading interest than low ability students.

Science

BROWN, W. R. "Science Textbook Selection and the Dale-Chall Formula," *School Science and Mathematics,* 65 (February 1965), 164-167.

Hypothesizes that, when applied to science books, the Dale-Chall formula yields results which are consistently higher than the actual reading level of the books. Further hypothesizes that this high estimate is largely due to the overabundance of "technical vocabulary" found in science books and the absence of such words from the Dale list.

CRAMER, W., and S. DORSEY. "Science Textbooks: How Readable are They?" *Elementary School Journal,* 70 (October 1969), 28-33.

Reports that six elementary science series were studied using the Spache formula and the Dale-Chall formula. The results indicate generally, that, for primary grades, vocabulary and sentence length have been controlled to appropriate grade levels. Wide variations were found at the intermediate level, where the estimated grade level for all books far exceeded the publisher's designation of grade level. Most primary textbook sample readability levels were below fourth grade. However, portions of eight of the fifth and sixth grade books were written at the college level.

HOLMQUIST, JOHN BRUCE. "A Determination of Whether the Dale-Chall Readability Formula May Be Revised to Evaluate More Validly the Readability of High School Science Materials," doctoral dissertation, Colorado State University, 1968.

Concludes that the Dale-Chall formula may be revised to evaluate more validly the readability of high school science materials. The changes in the vocabularies and reading ability of pupils raise questions as to the validity of the original Dale-Chall formula when used to evaluate the readability of today's materials.

JACOBSON, M. D. "Reading Difficulty of Physics and Chemistry Textbooks," *Educational and Psychological Measurement,* 25 (Summer 1965), 449-457.

Concludes on the basis of research reported here that reading difficulty was not a factor in the evaluation of textbooks for use in high school physics and chemistry classes.

LEE, W. D., and M. E. HISLOP. "Problems Involved in Placement of Students in a Biology Class," *School Science and Mathematics,* 68 (June 1968), 473-476.

Relates that this study aimed to evaluate selected Biological Science Curriculum Study (BSCS) textbooks to determine reading difficulty and to compare these data with Belden and Lee's report on readability of other general biology textbooks. The results indicate that the average student may experience much difficulty in dealing with the vocabulary and subsequent concepts to be learned in the BSCS textbooks as well as from other general biology texts.

LEMBESIS, A. C. "Reaching the Remedial Reader through Science," *Education,* 85 (January 1965), 288-293.

Discusses the merits of using high-interest trade books on various science topics to stimulate remedial readers. Suggests use of science materials and activities in place of, or to supplement, textbooks that are above the child's reading level.

MOORE, R. E. "Science Fiction in a Junior College Reading Program," *Journal of Reading,* 9 (April 1966), 329-332.

Lists readability scores of eight typical science fiction stories including human interest score. Explains appeal of science fiction.

OTTLEY, L. "Readability of Science Textbooks for Grades Four, Five, and Six," *School Science and Mathematics,* 65 (April 1965), 363-366.

Evaluates textbooks of four publishers. Concludes that there is a definite need for readable texts, particularly in grade four. Because of variation in reading ability the lower half of the class should be considered when selecting a text. A chart summarizing the data is included.

SHAW, ROBERT ARLEY. "Criterion and Independent Variables and the Precision Indexes of these Variables as Used in Establishing a Formula for Predicting Difficulty of Programed Materials in Fourth Grade Science," University of Virginia, 1967.

Reports a procedure developed to determine the reading difficulty of fourth grade science materials. The materials used consisted of three units of programed science materials.

WILLIAMS, D. L. "Rewritten Science Materials and Reading Comprehension," *Journal of Educational Research,* 61 (January 1968), 204-206.

Relates that one unit of a sixth grade textbook was analyzed and rewritten to a third grade level of readability. Those readers using the third grade level rewritten text were more successful as shown by comprehension scores and reading rates.

WINTHROP, H. "Problems of Communication in Science Education," *Science Education,* 52 (December 1968), 493-502.

States that readability is primarily avoiding ambiguity. Explains how readability formulas such as the Fog Index can be applied to scientific teaching materials. Illustrates the contrast between teachability and readability.

Social Studies

THOMAS, E. L., and P. MONTAG. "Social Studies Department Talks Back," *Journal of Reading,* 10 (October 1966), 22-28.

Discusses what the classroom teacher can and cannot do about matching materials with reading achievement of individual students. Discusses the practicality of providing students in one classroom with multilevel materials.

TURNER, DEVONNE GAE. *The Readability of Selected Second Grade Social Studies Textbooks.* Bloomington: Indiana University, School of Education, 1968.

Evaluates the readability level of three second grade social studies textbooks in which Spache and Yoakam formulas were used. *We Have Friends* was found to be on a second grade level but *You and the Neighbors* yielded higher levels of readability.

Miscellaneous

CALHOUN, C. C., and M. R. CALHOUN. "Comparison of the Readability Level of High School Bookkeeping Textbooks with the Reading Achievement of Bookkeeping Students," *Business Education Forum,* 22 (April 1968), 21-23.

Concludes that: 1) Reading achievement of bookkeeping students ranged from seventh grade to college level, 2) approximately half of the students tested were reading below their school grade placement, 3) the readability range of the bookkeeping textbooks ranged from sixth grade to college graduate, and 4) traditional bookkeeping instructional material is not suitable for many students.

KINTZER, F. C. "Investigation of Readability Levels of Junior College Faculty Handbooks," *California Journal of Educational Research,* 19 (January 1968), 34-41.

Relates that handbooks were found to be written at a level consistent with the general educational level of the instructors. The author warns that following formula rules too literally may make writing too stereotyped and inflexible. The author reminds that the short word is not always the right word.

LONDONER, CARROLL A. *A Readability Analysis of Randomly Selected Basic Education and Vocational Education Curriculum Materials as Measured by the Gunning Fog Index.* Bloomington: Indiana University, School of Education, 1967, ERIC AC 001 380 ED 014 628.

Reports that five job sheets used in vocational courses in heating and refrigerator installation and random samplings of "Success in Language/A" and "The Money You Spend" were analyzed. The job sheets tested at approximately the fifth grade level. "Success in Language/A" tested at the sixth grade level and "The Money You Spend" at fourth grade. The study concludes that corpsmen having attained fifth or sixth grade school levels of reading should be able to read the material.

SACKS, GEORGE A., and FLORENCE SACKS. "Reading Comprehension as a Factor in Communication with Engineers," paper presented at the 1968 International Reading Association Convention.

Relates that ten aerospace engineers were tested and found to have a reading level equivalent to college seniors. They understood about two-thirds of the sample company communications read. The company communications yielded a low reading ease level.

YAMAMOTO, K. "College Bulletin: For Whom?" *College and University,* 41 (Spring 1966), 340-347.

Reports that three readability formulas (Dale-Chall, Flesch, Smith) were applied. The results of this study indicate that most catalogs are comprehensible by college students and graduates but not easily read by high school students. Most catalogs, in addition, are dull reading.

READABILITY AND TYPES OF LEARNERS

DALE, EDGAR. "Vocabulary Development of the Underprivileged Child," *Elementary English,* 42 (November 1965), 778-786.

Discusses the effects of the factor of socioeconomic class on readability of material.

FELLENDORF, G. W. "Brand New Publications; World Traveler; Edition of the National Geographic School Bulletin for Teenagers with Language Handicaps," *Volta Review,* 71 (November 1969), 466-469.

Prepared for older children and young adults whose reading level approximates that of third grade. Twelve issues for $2.25 from World Traveler, 1537 35th Street N.W., Washington, D.C. 20007.

HARGIS, C. H. "Relationship of Available Instructional Reading Materials to Deficiency in Reading Achievement," *American Annuals of the Deaf,* 115 (January 1970), 27-29.

Discusses vocabulary including idioms and reading material selection.

KOELSCH, G. J. "Readability and Interests of Five Basal Reading Series with Retarded Students," *Exceptional Children,* 35 (February 1969), 487-488.

Demonstrates statistically that the basal reading series examined did not deviate substantially among themselves in readability, but there was a statistically significant deviation in interest categories in the reading series. A low correlation between interests of basal readers and the interests of educable mentally retarded pupils reading on that level was also demonstrated statistically.

REICHARD, C. L., and W. R. REID. "Investigation of Format for Reading Material for the Educable Mentally Retarded," *Journal of Reading,* 13 (February 1970), 363-366.

Reports that the authors experimented with spacing and marginal adjustments to determine how these factors affect readability for mentally retarded pupils. The use of variable line spacing and right margin verification appeared to have a definite and desirable effect upon the population studied.

READABILITY AND MEDIA

ADAMS, SARAH, ROBERT ROSEMEIER, and PHILLIP SLEEMAN. "Readable Letter Size and Visibility for Overhead Projection Transparencies," *Audiovisual Communication Review,* 13 (Winter 1965), 412-417.

Reports research which indicates that elite and pica size letters should be avoided in preparing overhead transparency projectuals. The 6/32 inch bulletin type *with* serif was found to be more readable than the 6/32 inch bulletin type *without* serif.

AQUINO, M. et al. "Reading Comprehension Difficulty as a Function of Content Area and Linguistic Complexity," *Journal of Experimental Education,* 37 (Summer 1969), 1-4.

Effects of the proportion of Latin suffixes and of the content area upon newspaper article comprehension of eighth graders, as measured by cloze procedure, were investigated using a 3 x 3 factorial design.

DE VITO, J. A. "Comprehension Factors in Oral and Written Discourse of Skilled Communicators," *Speech Monographs,* 32 (June 1965), 124-128.

Focuses on elements thought to determine ease of comprehension. Written and oral samples were compared. The written samples contained more difficult words, more verbal density, more idea density, and more grammatically simple sentences.

DULIN, KENNETH L. "Readability Levels of Adult Magazine Material," *National Reading Conference Yearbook,* 1968.

Relates that the readability levels of 15 popular magazines were determined by applying the Flesch, Farr-Jenkins-Paterson, Gunning, and Fry readability formulas to the lead articles of each. Average grade levels were determined by the four formulas to be 13, 14, 12.2, 10.9. Difficulty levels of popular magazines have risen over the years.

GRACE, G. L. "Application of Empirical Methods to Computer-Based System Design: Printout Formats," *Journal of Applied Psychology,* 50 (December 1966), 422-450.

Provides information about the clarity and usefulness of printout formats designed for use by military nonprogramer personnel. Verbal (information in words), data block (information in sets of data), and Eido form (information in maplike form) printout formats were compared.

KLARE, GEORGE, and LAWRENCE R. CAMPBELL. *Measuring the Readability of High School Newspapers.* Iowa City, Iowa: Quill and Scroll Foundation, 1967.

Reports that to ascertain the readability of high school newspapers 100 papers randomly selected from those submitted to the 1965 Quill and Scroll Critical Service were analyzed with the Flesch "reading ease" formula.

POULTON, E. C. "Searching for Newspaper Headlines Printed in Capitals or Lowercase Letters," *Journal of Applied Psychology,* 51 (October 1967), 417-425.

Tests the ease of recognition of newspaper headlines printed in capitals or lowercase letters. Headlines of varying heights written in capitals were determined to be harder to read than were boldly printed lowercase letters written at the same corresponding heights.

PRINNIE, A. F. "Telling It Like It Is," *School and Community*, 55 (January 1969), 32.

States that the average newspaper lead shrank from 39 to 32 words between 1940 and 1950. Stresses need for readable writing. Offers a 22-point checklist to help obtain that goal.

RAZIK, T. A. "Study of American Newspaper Readability: Dale-Chall Formula," *Journal of Communication*, 19 (December 1969), 317-324.

Reports significant differences in readability of the front page of metropolitan and nonmetropolitan newspapers. The nonmetropolitan newspapers tested at about one grade level higher than the metropolitan papers.

SEIBERT, WARREN F. "The Application of Readability to Educational Broadcasting," *Educational Broadcasting Review*, 3 (August 1969), 29-35.

Presents a nontechnical analysis off how readability formulas work and how they might be employed in educational radio and television. Reviews and evaluate criticisms of the formulas.

WALKER, W. L. "Measured Readability of Intermediate Grade Programed Textbooks: Dale-Chall Formula," *Teachers College Journal*, 37 (March 1966), 179-181+.

Reports that the readability level of programed texts evaluated by the Dale-Chall formula was consistently higher than the publisher's listed grade level. Use of uncommon words, 82 percent of which were repeated, was the main reason for the text's high readability levels. If students were taught the most repeated uncommon words before or during the program, the materials would be brought to an appropriate reading level.

READABILITY AND LITERACY MATERIALS

BARNES, ROBERT F., and ANDREW HENDRICKSON. *Graded Materials for Teaching Adult Illiterates.* Columbus, Ohio: Center for Adult Education, School of Education, Ohio State University, 1965.

HIEBERT, RAY ELDON (Ed.). *Books in Human Development.* Washington, D.C.: Agency for International Development and Department of Journalism, American University, 1965.

Analyzes reading materials available and their role in education in underdeveloped countries.

JACKSON, WILLIAM V. *The National Textbook Program and Libraries in Brazil.* Pittsburgh, Pennsylvania: University of Pittsburgh Book Center, 1967.

Analyzes available reading materials and their effects.

KLITGAARD, S. A. *Educational Books in West, Central, and East Africa.* Copenhagen: A Kademisk Farlags (for the Danish National Commission for UNESCO), 1966.

Analyzes reading materials available and their present and potential role.

OTTO, WAYNE, and DAVID FORD. *Materials for Teaching Adults to Read,* Working Paper No. 2. Madison: Research and Development Center for Learning and Reeducation, University of Wisconsin, 1966.

Reports extensive survey and review of materials available for teaching illiterate adults to read.

RICHARDS, C. G. *The Provision of Popular Reading Materials.* Paris: United Nations Educational, Scientific, and Cultural Organization, 1959.

Reports research in several countries done by Seth Spaulding and others. The studies generally indicated that authors profit from carefully designed field testing and revision of materials, and that newly literate adults will read materials, if readily available and if written at their level of reading ability. The report suggests areas for research.

SPAULDING, SETH (Chairman). *A Study of Present and Needed Book Activities in National Development: Peru.* Pittsburgh, Pennsylvania: International and Development Education Program, University of Pittsburgh, 1967.

Reports the study of the book creation, production, distribution, and utilization process.

READABILITY AND LEGIBILITY

Artwork Size Standards for Projected Visuals, pamphlet S-12. Rochester, New York: Eastman Kodak.

Presents formulas for testing the legibility of artwork and projected images. Recommends minimum letter sizes for different viewing distances.

COLEMAN, EDMUND B., and S. C. HAHN. "Failure to Improve Readability with a Vertical Typography," *Journal of Applied Psychology,* 50 (October 1966), 434-436.

Indicates that vertical typography as opposed to horizontal typography does not significantly increase the subject's speed of reading or degree of comprehension.

DEMILIA, L. A. "Visual Fatigue and Reading," *Journal of Education,* 151 (December 1968), 4-34.

Summarizes and discusses at length some of the relevant scientific literature on visual fatigue, with special emphasis on the psychology of word perception, the determinants of legibility, and the role of various typographical factors.

ERDMAN, R. L., and A. S. NEAL. "Word Legibility as a Function of Letter Legibility with Word Size, Word Familiarity, and Resolution as Parameters," *Journal of Applied Psychology,* 52 (October 1968), 403-409.

To determine the relationship between letter legibility and word legibility, individual characters in context were compared with isolated characters. The study concluded that if the degree of familiarity of words is known, word legibility can be predicted with reasonable accuracy on the basis of letter legibility.

Legibility Standards for Projected Materials, Pamphlet 5-4. Rochester, New York: Eastman Kodak.

Presents a table comparing the medium of projection, maximum viewing distance, ratio of letter height to height of art work area, and minimum letter heights for 6-¾" x 9" and 9" x 12."

MARKS, M. B. "Improve Reading through Better Format," *Journal of Educational Research,* 60 (December 1966), 147-151.

Relates that this study aimed to identify helpful elements of format by testing the effectiveness of 22 different formats with 1,650 junior high students. Results proved that format did alter individuals' reading competency or effectiveness.

POULTON, E. C. "Asymmetrical Transfer in Reading Texts Produced by Teleprinter and by Typewriter," *Journal of Applied Psychology,* 53 (June 1969), 244-249.

Reports that the poorer readers found elite (upper and lowercase, single spacing) easier to comprehend than Siemans (uppercase, triple spacing). They showed positive transfer when reading Siemans after elite and negative transfer when reading elite after Siemans. The good readers did not find elite any easier than Siemans, and showed no reliable transfer effects. The Tinker Speed of Reading Test was used.

POULTON, E. C., and C. H. BROWN. "Rate of Comprehension of an Existing Teleprinter Output and of Possible Alternatives," *Journal of Applied Psychology,* 52 (February 1968), 16-21.

Relates that text typed in pica combining upper and lowercase letters was comprehended on the average about 13 percent faster than text in pica or Siemans all uppercase letters. Other comparisons were made between Siemans all uppercase, pica and elite all uppercase, and pica and elite all lowercase.

TINKER, M. "Suitable Typography for Beginners in Reading," *Education,* 88 (April 1968), 317-320.

Reviews literature and concludes that to achieve optimum legibility of printing for beginning readers, typeface size, leading, length of line, ink, and paper must be coordinated. Gives specific directions for the use of the best forms of each of these variables.

TINKER, MILES A. "The Ten Most Important Legibility Studies," *Reading Teacher,* 20 (October 1966), 46-48.

Annotates studies ranging from 1912-1964.